What is claimed is:

1. A method for measuring a bone mineral density, by use of
an x-ray image, in a bone mineral density measuring system, comprising
the steps of:

(a) obtaining an X-ray image of bone;

(b) setting a region of interest on the obtained X-ray image
of bone;

(c) calculating a background trend due to soft tissues, at
a bone portion within the set region of interest; and

(d) calculating an index of the bone mineral density by removing
the background trend due to the soft tissues, at the bone portion
within the set region of interest.

2. The method as recited in claim 1, wherein the region of
interest, containing the soft tissue portions at a left and right
of the bone portion, is set in the obtained x-ray image of bone.

3. The method as recited in claim 1, wherein said step (c)
includes the steps of;

(c1) selecting a fitting function to calculate the background
trend of the bone portion; and

(c2) setting the background trend by interpolating the gray-level
profiles of the soft tissue portions adjacent to the bone portion
into the bone portion by the selected fitting function.

4. The method as recited in claim 3, wherein said step (c2)

19

includes the steps of;

(c2-a) obtaining the gray-level profile from the region of interest;

(c2-b) dividing the obtained gray-level profile into the bone portion and the soft tissue portions; and

(c2-c) interpolating the gray-level profiles of the divided soft tissue portions into the bone portion by the fitting function and setting an interpolation result to the background trend due to the soft tissues.

5. The method as recited in claim 3, wherein the fitting function is a polynomial of a 4th order or less.

6. The method as recited in claim 5, wherein a fitting of the polynomial is done by a Levenberg-Marquardt fitting method.

7. The method as recited in claim 3, wherein said step (d) includes the steps of:

(d1) removing the background trend from the gray-level of each pixel at the bone portion;

(d2) calculating an average value ($<G>$) of gray-level values at the bone portion after the background trend was removed;

(d3) calculating a weighted average (P) of the bone widths within the region of interest; and

(d4) setting an index of the bone mineral density by adding a value of the weighted average (P) multiplied by a specific constant (c_0) to the average value ($<G>$).

8. The method as recited in claim 7, wherein the weighted average (P) is set to the average bone width within the region of interest.

9. The method as recited in claim 7, wherein the weighted average (P) is set by dividing a sum of squares of the bone widths within the region of interest by a sum of the bone widths within the region of interest.

10. The method as recited in claim 7, wherein the specific constant (c_0) of said step (d4) is set to zero.

11. The method as recited in claim 7, wherein the specific constant (c_0) of said step (d4) is set to a value that minimizes a least-squares fit error between the index of bone mineral density ($<G> + c_0P$) and the bone mineral density measured by a bone mineral density measuring equipment.

12. A computer readable recording medium storing instructions to implement a method for measuring a bone mineral density, by use of an x-ray image, in a bone mineral density measuring system, said method comprising the steps of:
(a) obtaining an X-ray image of bone;
(b) setting a region of interest on the obtained X-ray image of bone;
(c) calculating a background trend due to soft tissues, at a bone portion within the set region of interest; and

21

(d) calculating an index of the bone mineral density by removing the background trend due to the soft tissues, at the bone portion within the set region of interest.

13. The storage medium as recited in claim 12, wherein said step (c) includes the steps of;

(c1) selecting a fitting function to calculate the background trend at the bone portion; and

(c2) setting the background trend by interpolating the gray-level profile of the soft tissue portions adjacent to the bone portion into the bone portion by the selected fitting function.